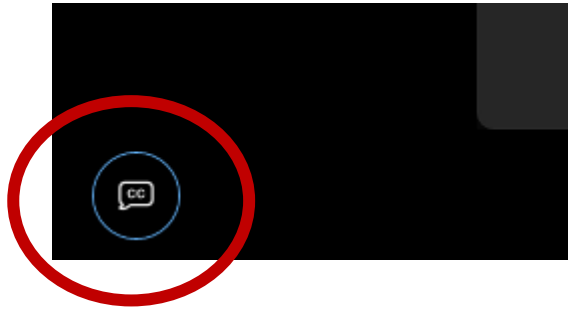FMR Beginners Hands On

A hands-on introduction to Fusion Metadata Registry 11 (FMR)

BIS Monetary and Economic Department IT

House keeping

- The webinar will be recorded and shared on YouTube

- To turn on captioning, choose the 'CC' icon at the bottom left of the Webex window

- Please write questions in the Webex chat - there'll be a Q&A session at the end
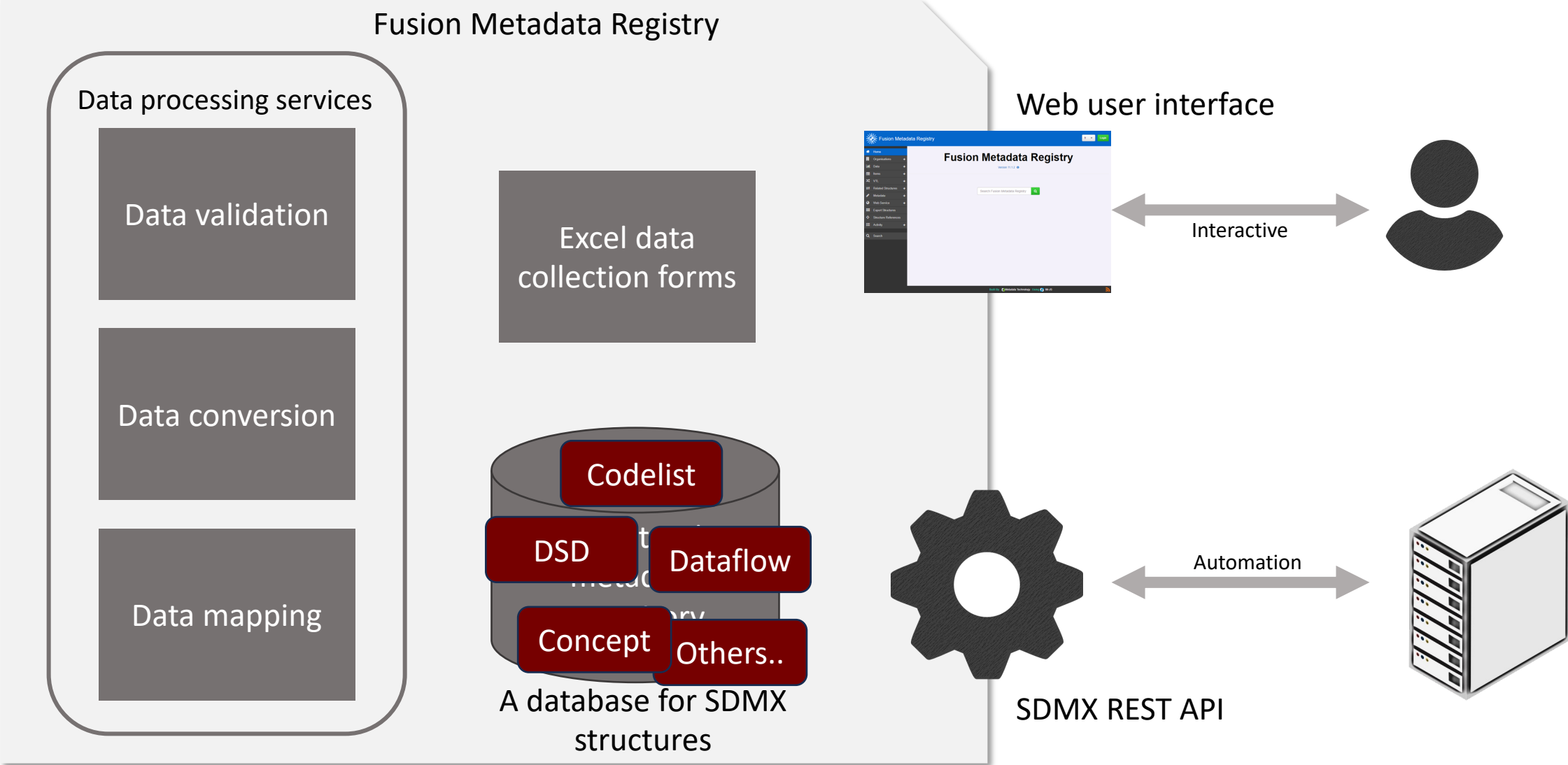
Agenda

Introduction
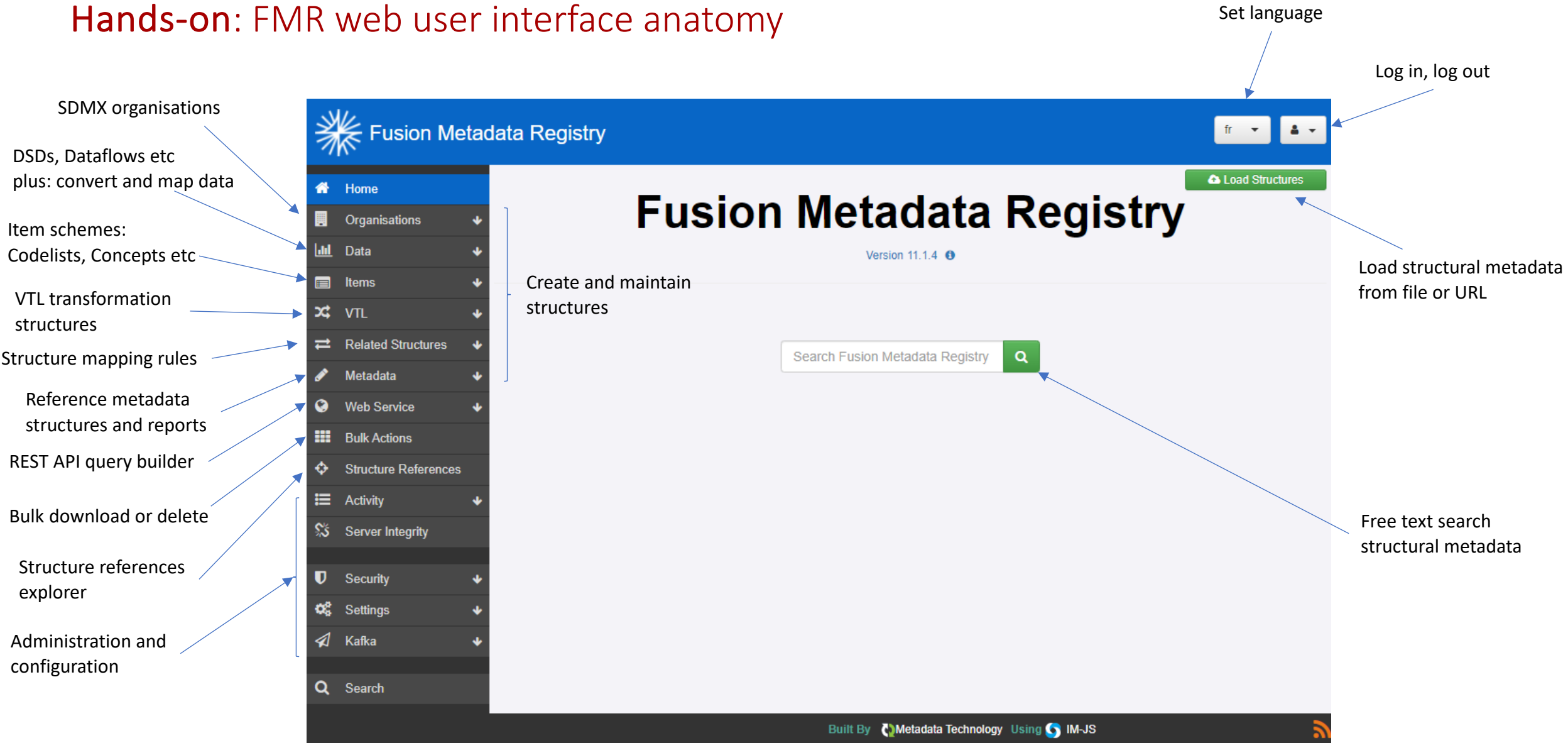
- What is Fusion Metadata Registry

Hands on

- Installation using Docker

- Maintaining the SDMX structures with the web user interface

- Working with data: validate, convert, map

- Using the SDMX REST API: a practical validation example using 'R'

Questions (15-20 mins)

What is Fusion Metadata Registry

Hands-on: FMR web user interface anatomy

Set language

Log in, log out

SDMX organisations

DSDs, Dataflows etc
plus: convert and map data

Item schemes:
Codelists, Concepts etc

VTL transformation
structures

Structure mapping rules

Reference metadata
structures and reports

REST API query builder

Bulk download or delete

Structure references
explorer

Administration and
configuration

Fusion Metadata Registry

fr

⬆ Load Structures

Fusion Metadata Registry

Version 11.1.4 ⓘ

Create and maintain
structures

Load structural metadata
from file or URL

Search Fusion Metadata Registry 🔍

Free text search
structural metadata

Left menu

🏠 Home
🏢 Organisations ⬇
📊 Data ⬇
🖥 Items ⬇
🔀 VTL ⬇
⇄ Related Structures ⬇
✏ Metadata ⬇
🌐 Web Service ⬇
▦ Bulk Actions
✛ Structure References
☰ Activity ⬇
⚙ Server Integrity
🛡 Security ⬇
⚙ Settings ⬇
✈ Kafka ⬇
🔍 Search

Built By 🔵Metadata Technology Using 🔵 IM-JS

What is Fusion Metadata Registry (FMR)

Wikipedia:
"A **metadata registry** is a central location in an organization where metadata definitions are stored and maintained in a controlled method."

"Structural metadata registry to the SDMX specification"

All SDMX **structures**
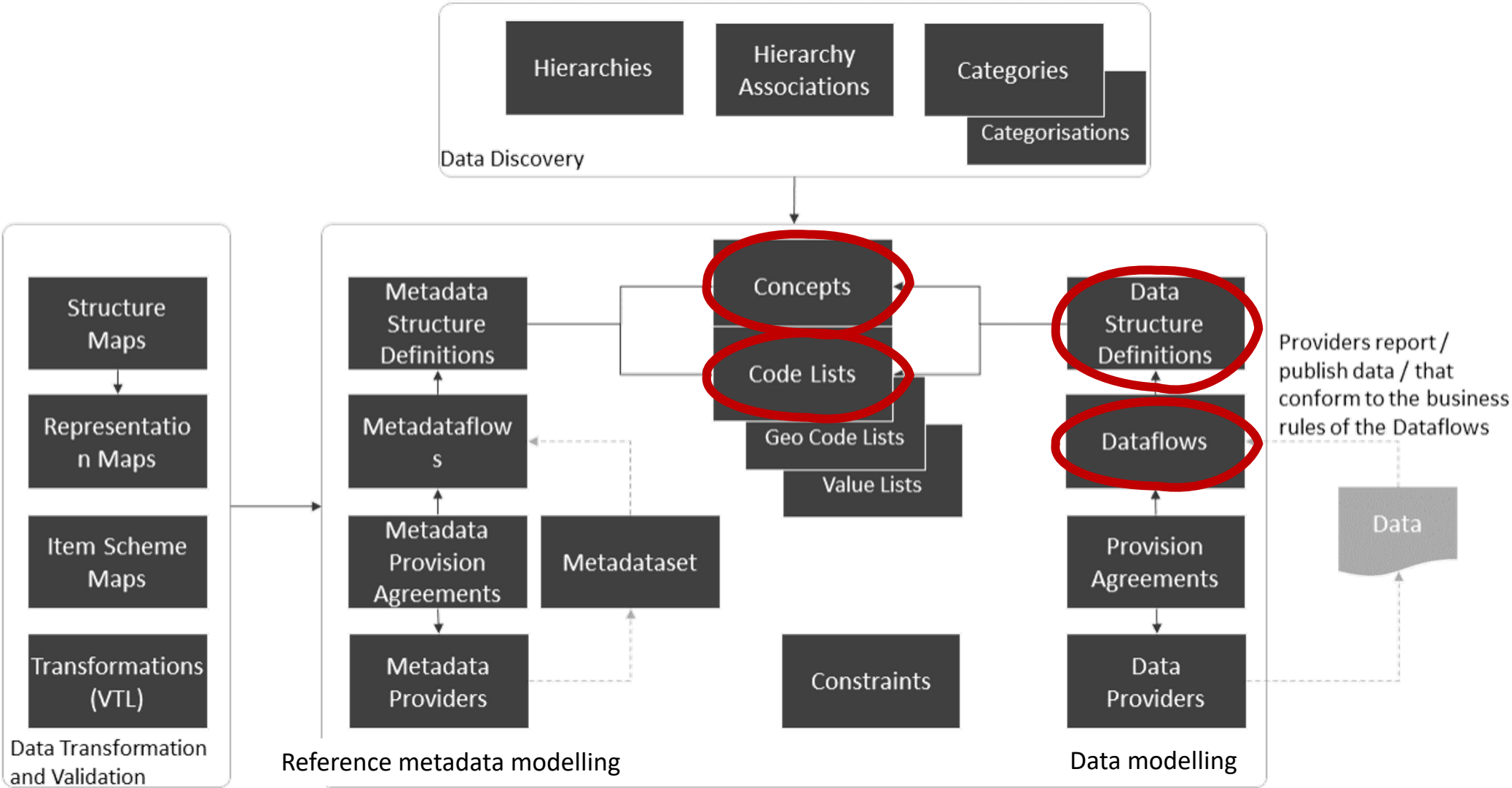e.g. Concepts, Codelists, Data Structure Definitions, Category Schemes, Structure Maps etc...
Plus: **reference metadata reports** which are treated like structures in SDMX 3.0

Uses the **SDMX 3.0 'metamodel'**

SDMX 2.1 model backward compatible

SDMX uses the term 'information model' rather than 'metamodel'

FMR 11 uses the SDMX 3.0 metamodel (information model)

SDMX 2.1 metamodel suppo[rt]
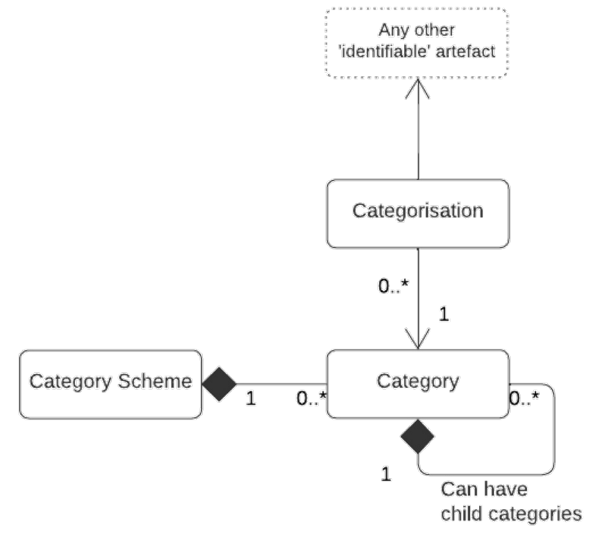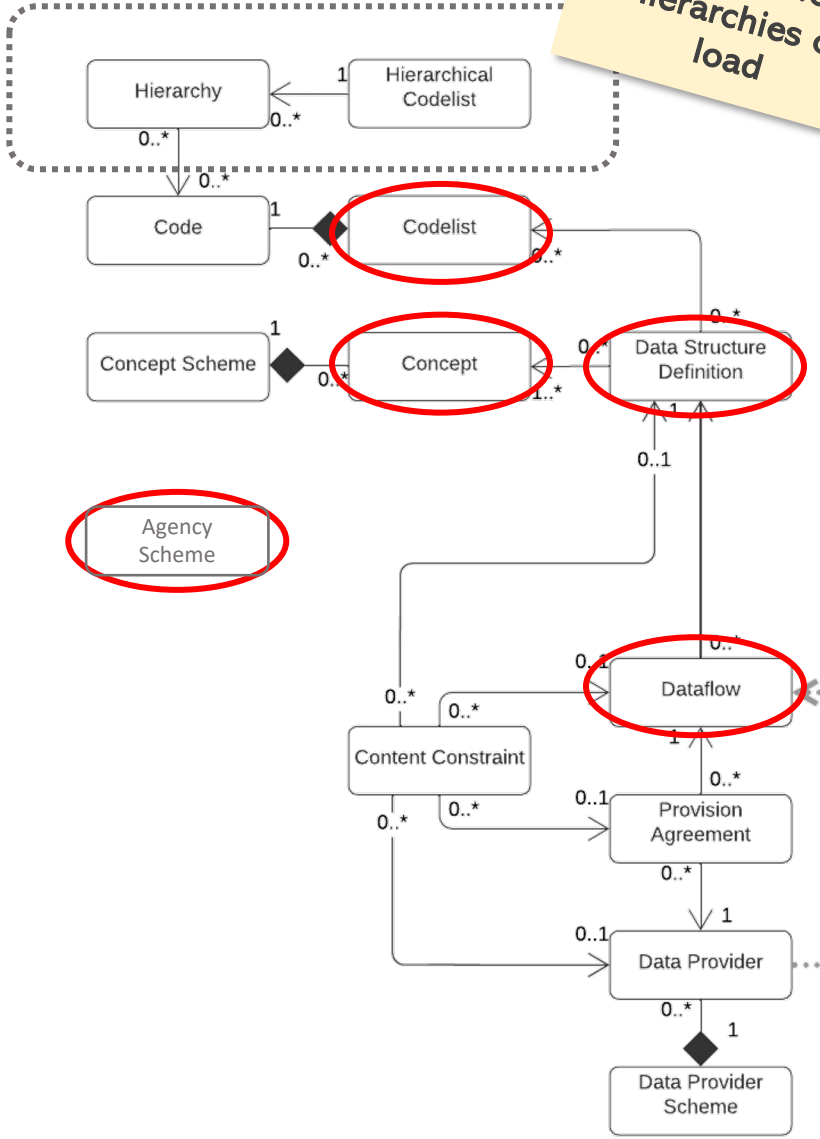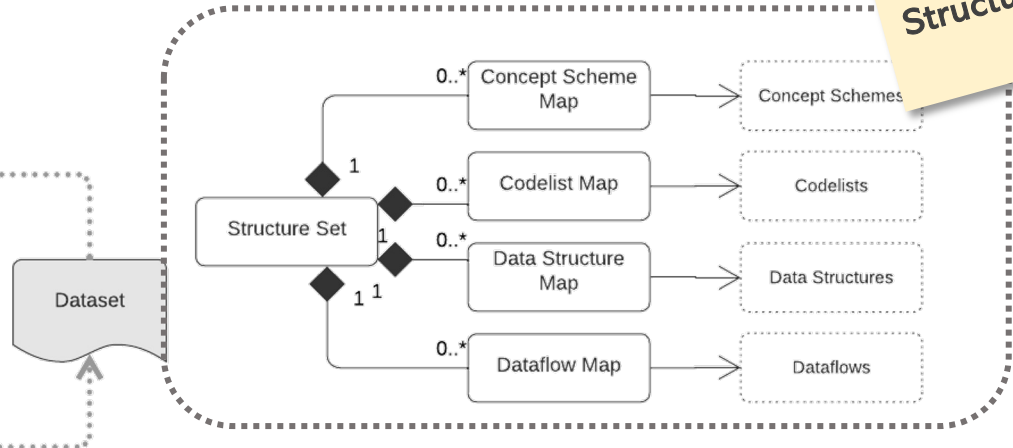
(simplified)

Key FMR use cases

Centralised structural metadata registry

- Externalise and centralise metadata
- Metadata governance – gain control
- Improve metadata maintainability
- Metadata reuse
- Harmonisation of concepts

Data collection

- Publish structural metadata for data reporters
- Generate Excel data reporting forms
- Validate received datasets

Enables 'metadata-driven' solutions

Data reporting

- Validate SDMX data prior to submission
- Convert data between SDMX formats
- Data mapping – transform data to the collector's DSD

SDMX structures authoring / maintenance

- Create and modify SDMX structures interactively using the web user interface

Installing FMR

FMR is a Java 'web application' that will run on Windows, Linux, Mac and other platforms

Option 1
Install on a Java **web application server** like Apache Tomcat
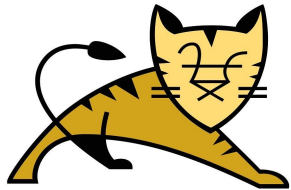
Option 2
Run FMR in a **'container'**

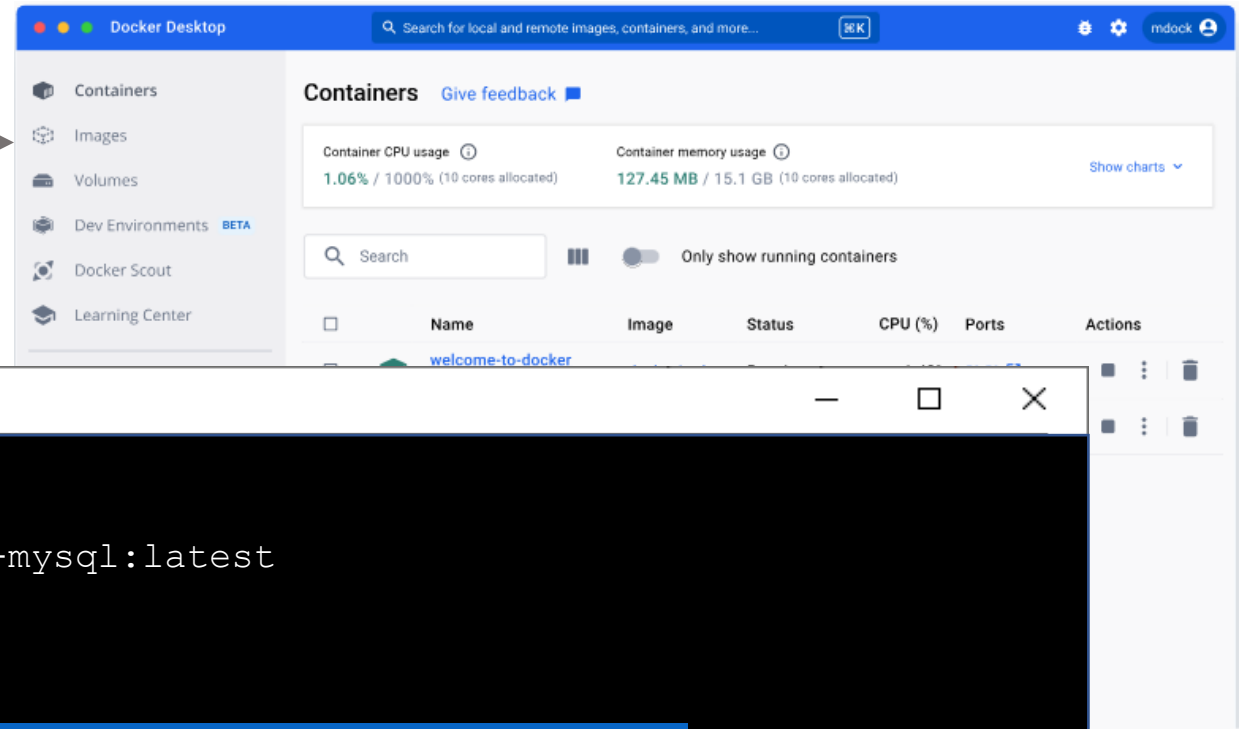Production and enterprise deployments
Choose where more flexibility is required

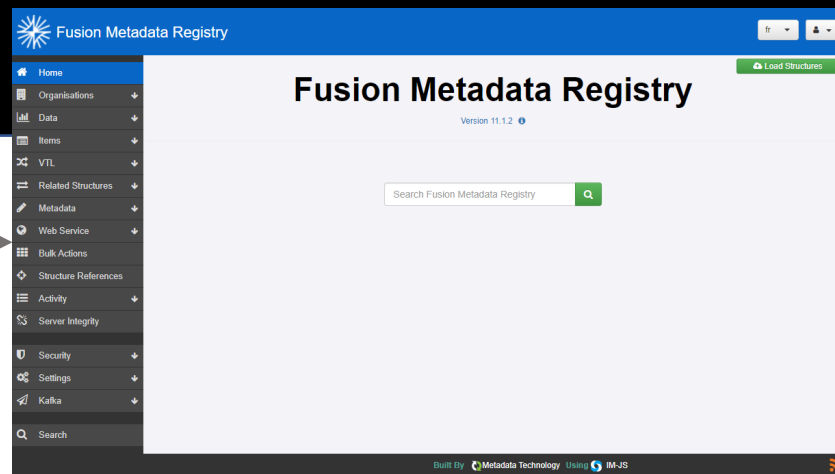Personal, testing and light production workloads
Fast and simple to install

Hands-on: Run FMR using Docker

1. Install Docker Desktop

2. Create and start an FMR container

```
C:\docker run --name myfmr -p 8080:8080 sdmxio/fmr-mysql:latest
```

3. Browse to http://localhost:8080
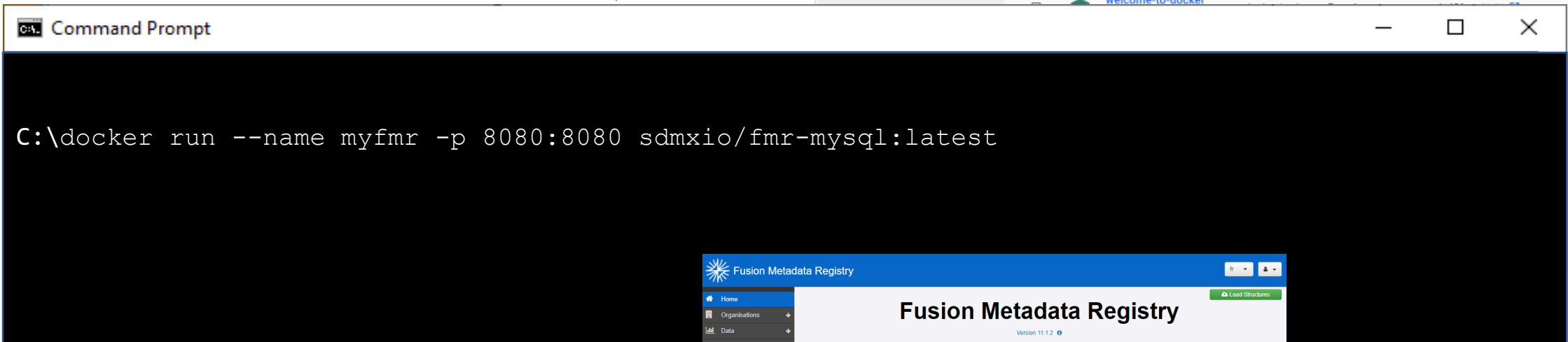
More information on sdmx.io

Hands-on: maintaining structures with the FMR web user interface

Core SDMX structures

- Agencies

- Concepts

- Codelists

- Data Structure Definitions

- Dataflows

Working with data

Fusion Metadata Registry

Data processing services

Data validation

Data conversion

Data mapping

Excel data collection forms generator

Structural metadata repository

Web user interface

Interactive

Automation

SDMX REST API

Hands-on: working with data – validate, map, convert
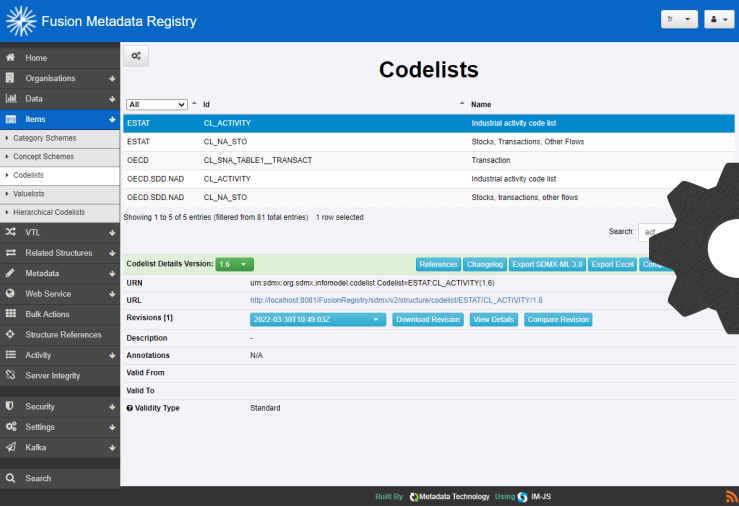

Disk file or URL

Using the REST API
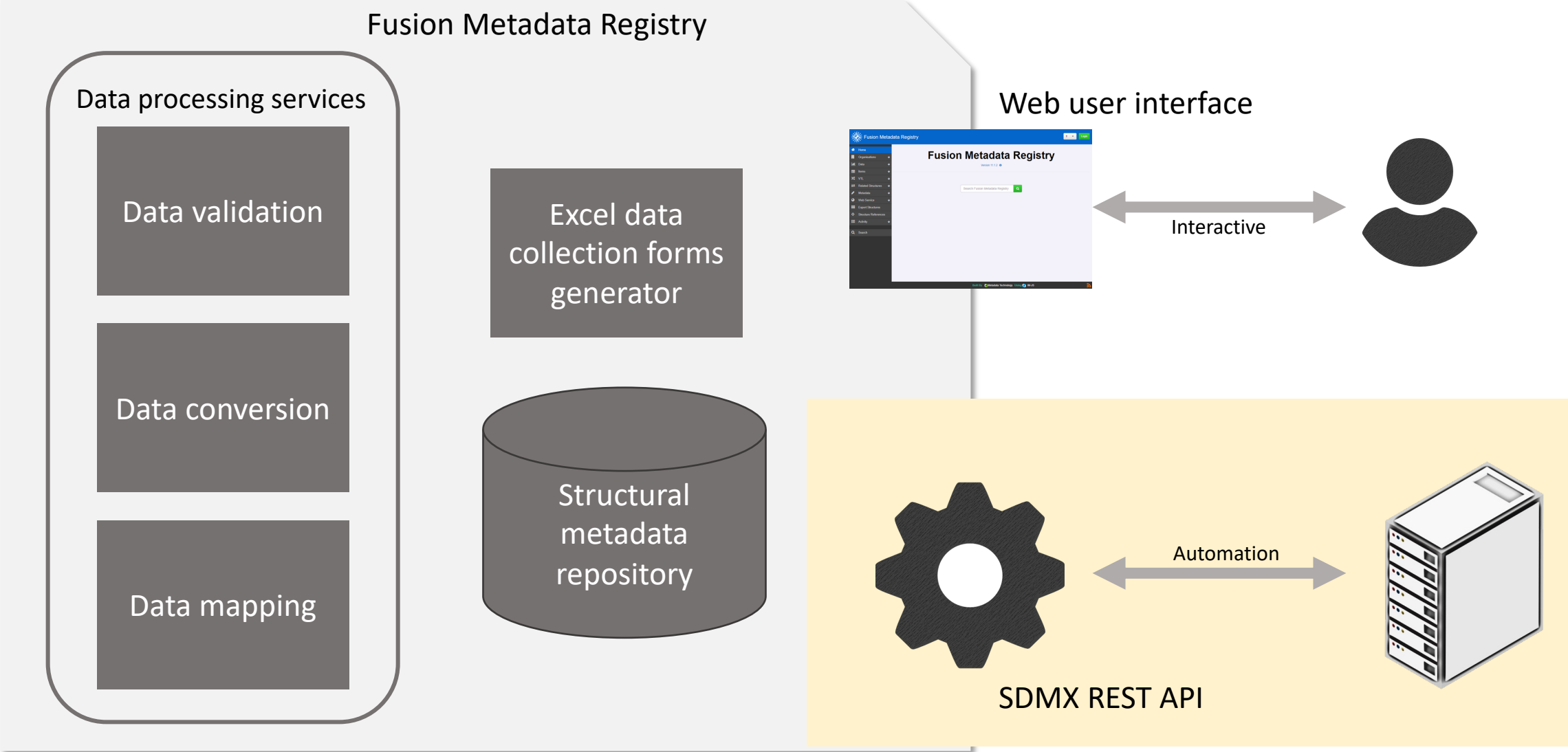
Hands-on: using the SDMX REST API
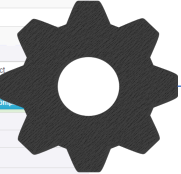
Practical example: metadata-driven data validation using R

Use case – validate variables in a CSV dataset against Codelists pulled from FMR's SDMX REST API

Validation results

Retrieve Codelist
from the FMR
SDMX REST API

R data
cleaning
code

CSV
dataset

Reference:
MPJ van der Loo (2022) *The Data Validation Cookbook* version
1.1.0. https://data-cleaning.github.io/validate

Hands-on: using the SDMX REST API

Practical example: metadata-driven data validation using R

```
install.packages("rsdmx")
install.packages("validate")
library(rsdmx)
library(validate)


dataset <- read.csv("mydata.csv")
rules <- validator(obs_value > 0
        , activity %in% sdmx_codelist(endpoint = http://localhost:8080/ws/public/sdmxapi/rest
        , agency_id = "ESTAT"
        , resource_id = "CL_ACTIVITY"))
out <- confront(dataset,rules)
summary(out)
violating(dataset,rules)
```

Read the data to validate from a CSV file into a data frame. The data does not have to be in SDMX format.

This rule tests whether the 'activity' variable in our dataset complies with the ESTAT:CL_ACTIVITY codelist retrieved from FMR using its SDMX REST API.

References

FMR product page	https://www.sdmx.io/tools/fmr/
BIS Open Tech initiative	https://www.bis.org/innovation/bis_open_tech_sdmx.htm
FMR on Docker Hub	https://www.sdmx.io/resources/containers/fmr-docker-mysql/
FMR Java web app download	https://www.sdmx.io/resources/download/fmr/
FMR Wiki – general reference	https://fmrwiki.sdmxcloud.org/
Data Validation Cookbook	http://data-cleaning.github.io/validate/

Questions

BIS MED IT
Glenn Tice
glennphilip.tice@bis.org